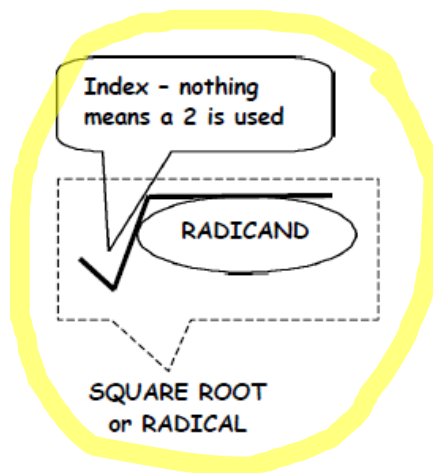


4.3 Simplifying Radicals

Number	Square
1	$1^2 = 1$
2	$2^2 = 4$
3	$3^2 = 9$
4	$4^2 = 16$
5	$5^2 = 25$
6	$6^2 = 36$
7	$7^2 = 49$
8	$8^2 = 64$
9	$9^2 = 81$
10	$10^2 = 100$



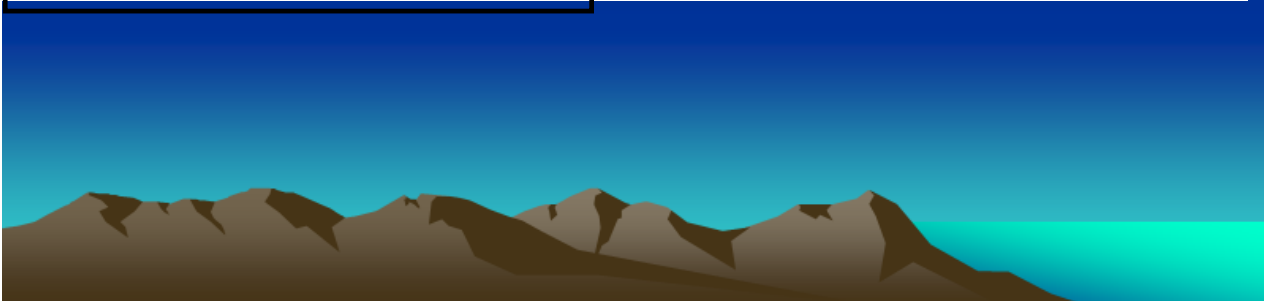
Perfect Square	Square Root
1	$\sqrt{1} = 1$
4	$\sqrt{4} = 2$
9	$\sqrt{9} = 3$
16	$\sqrt{16} = 4$
25	$\sqrt{25} = 5$
36	$\sqrt{36} = 6$
49	$\sqrt{49} = 7$
64	$\sqrt{64} = 8$
81	$\sqrt{81} = 9$
100	$\sqrt{100} = 10$

A perfect square is a number that when you find the square root, you do not get a decimal answer (you get a whole number for an answer). Examples are #1,4,9,16,25)

Simplifying Square Roots

Simplifying Square Roots

STEPS	EXAMPLE 1 $\sqrt{8}$	EXAMPLE 2 $\sqrt{63}$	EXAMPLE 3 $\sqrt{162}$
A) Rewrite the radicand as a product of the greatest perfect square and its coinciding factor	A) $\sqrt{8} = \sqrt{4 \cdot 2}$	A) $\sqrt{63} = \sqrt{9 \cdot 7}$	A) $\sqrt{162} = \sqrt{81 \cdot 2}$
B) Split the two factors apart	B) $\sqrt{4 \cdot 2} = \sqrt{4} \cdot \sqrt{2}$	B) $\sqrt{9 \cdot 7} = \sqrt{9} \cdot \sqrt{7}$	B) $\sqrt{81 \cdot 2} = \sqrt{81} \cdot \sqrt{2}$
C) Simplify the perfect square under the square root.	C) $\sqrt{4} \cdot \sqrt{2} = 2\sqrt{2}$	C) $\sqrt{9} \cdot \sqrt{7} = 3\sqrt{7}$	C) $\sqrt{81} \cdot \sqrt{2} = 9\sqrt{2}$



Simplifying Square Roots

Example: $\sqrt{8}$

STEPS	EXAMPLE 1 $\sqrt{8}$
A) Rewrite the radicand as a product of the greatest perfect square and its coinciding factor	A) $\sqrt{8} = \sqrt{4 \cdot 2}$
B) Split the two factors apart	B) $\sqrt{4 \cdot 2} = \sqrt{4} \cdot \sqrt{2}$
C) Simplify the perfect square under the square root.	C) $\sqrt{4} \cdot \sqrt{2} = 2\sqrt{2}$

Example 2:

$$\begin{array}{l} \sqrt{63} \\ \hline \sqrt{9 \cdot 7} \\ \left\{ \begin{array}{l} \sqrt{9} \cdot \sqrt{7} \\ 3 \cdot \sqrt{7} \end{array} \right. \\ \rightarrow 3\sqrt{7} \end{array}$$

Example 3: $\sqrt{162}$

$$\begin{array}{l} \sqrt{162} \\ \hline \sqrt{81 \cdot 2} \\ 9\sqrt{2} \end{array}$$

1
4
9
16
25
36
49
64
81
100

1 Can this number be simplified?

A Yes

B No

$$\sqrt{10}$$

(For another question, go to the next page.)

2 Can this number be simplified?

A Yes

B No

$$\sqrt{27}$$



Simplify the following square roots.

1) $\sqrt{27}$

2) $\sqrt{32}$
 $\sqrt{16 \cdot 2}$
 $4\sqrt{2}$

3) $\sqrt{125}$

4) $\sqrt{128}$
 $\sqrt{64 \cdot 2}$
 $8\sqrt{2}$

5) $\sqrt{600}$

6) $\sqrt{80}$
 $\sqrt{16 \cdot 5}$
 $4\sqrt{5}$

7) $\sqrt{108}$

8) $\sqrt{75}$
 $\sqrt{25 \cdot 3}$
 $5\sqrt{3}$

1
4
9
16
25
36
49
64
81
100

ANSWERS

Simplify the following square roots.

1) $\sqrt{27}$

$$3\sqrt{3}$$
$$(\sqrt{9} \cdot \sqrt{3})$$

2) $\sqrt{32}$

$$4\sqrt{2}$$
$$(\sqrt{16} \cdot \sqrt{2})$$

3) $\sqrt{125}$

$$5\sqrt{5}$$
$$(\sqrt{25} \cdot \sqrt{5})$$

4) $\sqrt{128}$

$$8\sqrt{2}$$
$$(\sqrt{64} \cdot \sqrt{2})$$

5) $\sqrt{600}$

$$10\sqrt{6}$$
$$(\sqrt{100} \cdot \sqrt{6})$$

6) $\sqrt{80}$

$$4\sqrt{5}$$
$$(\sqrt{16} \cdot \sqrt{5})$$

7) $\sqrt{108}$

$$6\sqrt{3}$$
$$(\sqrt{36} \cdot \sqrt{3})$$

8) $\sqrt{75}$

$$5\sqrt{3}$$
$$(\sqrt{25} \cdot \sqrt{3})$$